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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/982,846	10/22/2001	Atsushi Koike	839.449	8378

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EXAMINER
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KIELIN, ERIK J

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 12/23/2002

8

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/982,846

Applicant(s)

KOIKE ET AL.

Examiner

Erik Kielin

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 5-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-4 and 9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5. 6) ☐ Other: \_\_\_\_\_

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### DETAILED ACTION

This action responds to the election and preliminary amendment filed 28 October 2002 (Paper No. 7), the IDS filed 15 April 2002 (Paper No. 5), and the priority document filed 14 January 2002 (Paper No. 4).

#### *Election/Restrictions*

1. Applicant's election with traverse of the species of Group I, claims 1-4 in Paper No. 7 is acknowledged. The traversal is on the ground(s) of statements in MPEP 808.02, "Related Inventions" indicating that separate classification, separate status in the art, or a different field of search. This is not found persuasive because MPEP 808.02 is not directed to species restriction, but instead, as the section titles states, to related inventions. Accordingly, separate classification, separate status in the art, or a different field of search is not required to make a species restriction.

The traversal is also on the ground(s) that 37 C.F.R. 1.146 states that a reasonable number of species may be examined and that two species is not an unreasonable number. This is not found persuasive because, as indicated in the previous office action, filed 20 September 2002, 35 U.S.C. 121 indicates that Applicant may be restricted to a single disclosed species. The species are indicated to be different and are shown in Figs. 1 and 14. (See p. 42 of the instant specification.)

Moreover, the restriction requirement stated,

**"Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the**

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examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.” (Emphasis added.)

In as much as Applicant has *not* stated on the record that the indicated species obvious variants, it would appear that Applicant agrees that indicated species are, in fact, patentably distinct. Examiner is willing to consider any species for which Applicant clearly admits on the record, or for which Applicant provides evidence indicating that, the species are obvious variants.

Newly submitted claim 9 is acknowledged. It is not generic as alleged by Applicant because the species were indicated, in the restriction requirement filed 20 September 2002 as being drawn to with, and without, electrical isolation between the substrate and the auxiliary electrode. No isolation between the auxiliary electrode and the substrate is presented in amended claim 9. Rather claim 9 incorporates a Markush group indicating possible locations of the auxiliary electrode, one of which is as claimed in independent claim 1. Accordingly, there still exists no generic claim.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 5-8 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim.
3. Claims 1-4 and 9 are active and will be examined.

***Priority***

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

*Drawings*

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **106** (p. 43 of specification). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

*Specification*

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

7. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and **legal phraseology** often used in patent claims, such as "means" and "**said,**" should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

*Claim Rejections - 35 USC § 112*

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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9. Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 3, as presently written, requires the limitation that the "*discharge electrode* is arranged such that said discharge electrode is opposed to a film-forming surface of the substrate and is situated at a position between the substrate and the *discharge electrode*." It is not possible for a thing to be positioned between itself and anything else. Instead, there must exist a third object. The claim will be interpreted as best understood by Examiner.

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

11. Claims 1, 3, 4, and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,488,995 B1 (**Nishimoto et al.**).

Regarding claims 1 and 9, **Nishimoto** discloses a film-forming method for forming a deposited film on a substrate arranged in a substantially enclosed film-forming vessel (Fig. 2) by means of plasma CVD, said film-forming vessel being provided with a raw material gas

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introduction means **203, 204** and an exhaustion means, said film-forming method comprising the steps of

introducing a raw material gas comprising at least a hydrogen gas and a silicon-containing raw material gas into said film-forming vessel through said raw material gas introduction means (Fig. 23),

maintaining an inner pressure of said film-forming at a desired value by means of said exhaustion means (labeled "V.P." for vacuum pump; Fig. 23); and

introducing a high frequency power into said film-forming vessel through a discharge electrode **206** provided in said film-forming vessel to generate a plasma in a plasma generation region between said substrate **201** and said discharge electrode **206** in said film-forming vessel, thereby forming said deposited film on said substrate maintained at a desired temperature using heater **202**,

characterized in that the formation of said deposited film on said substrate is performed while applying a periodicity voltage (RF voltage at 13.56 MHz) having at least two different waveform components having a different amplitude to an auxiliary electrode **208** arranged at a position in said plasma generation region of said film-forming vessel. (See col. 12, lines 8-16, wherein it is indicated that the RF voltage to the auxiliary electrode **208** is automatically changed according to a reader. This means that at least two different RF waveform components of different amplitude [i.e. voltage, since voltage is that which is being adjusted] are necessarily applied to the auxiliary electrode as required to make such a change.)

(See also **Nishimoto** col. 10, lines 6-19; col. 11, line 56 to col. 12, line 16. See also, the examples in cols. 14-20.)

Regarding claim 3, the discharge electrode is arranged such that said discharge electrode is opposed to a film-forming surface of the substrate and is situated at a position between the substrate and the "discharge electrode." (See Fig. 2.)

Regarding claim 4, the auxiliary electrode is arranged to be in parallel to the substrate and perpendicular to a flowing direction of the raw material gas which flows from the raw material introduction mean toward the exhaustion means in the film-forming vessel. (See Fig. 2.)

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishimoto** in view of US 5,472,508 (**Saxena**).

**Nishimoto** does not teach that the periodicity voltage has (i) a waveform component having an amplitude capable of generating mainly a radical of a silicon-containing compound and (ii) a waveform component having an amplitude capable of forming mainly a radical of hydrogen.

**Saxena** teaches a CVD method wherein a voltage is applied to auxiliary electrode 6, 8, having a pulse height (amplitude), pulse width, and pulse repetition appropriate for forming radicals of each species being deposited. (Abstract; col. 4, lines 17-38; col. 5, lines 31-45.)



It would have been obvious for one of ordinary skill in the art, at the time of the invention to use separate waveform components appropriate for forming Si radicals and for forming H radicals, as taught by **Saxena**, in the method of **Nishimoto**, in order to aid the dissociation of the reactive silicon gas and the hydrogen gas, as taught by **Saxena**, and thereby increase the deposition rate.

14. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,348,238 B1 (**Mizuno et al.**) in view of US 3,757,733 (**Reinberg**).

**Mizuno** discloses a film-forming method for forming a deposited film on a substrate arranged in a substantially enclosed film-forming vessel 1 by means of plasma CVD, said film-forming vessel being provided with a raw material gas introduction means 3 (Fig. 5) and an exhaustion means 11, said film-forming method comprising the steps of

introducing a raw material gas into said film-forming vessel through said raw material gas introduction means 3 (col. 18, lines 23-54);

maintaining an inner pressure of said film-forming at a desired value by means of said exhaustion means (col. 6, lines 50-51; col. 17, lines 23-26); and

introducing a high frequency power into said film-forming vessel through a discharge electrode 4 (col. 6, line 56) provided in said film-forming vessel 1 to generate a plasma in a plasma generation region between said substrate and said discharge electrode in said film-forming vessel, thereby forming said deposited film on said substrate maintained at a desired temperature (col. 6, line 56);

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characterized in that the formation of said deposited film on said substrate is performed while applying a periodicity voltage having at least two different waveform components having a different amplitude to an auxiliary electrode arranged on a side opposite a film-forming, face of said substrate in said film-forming vessel (Figs. 6(1)-6(2); col. 13, line 61 to col. 15, line 42).

**Mizuno** does not indicate that the raw material gas includes a hydrogen gas and a silicon-containing raw material gas, but does indicate that the plasma treatment method is appropriate for chemical vapor deposition, CVD (col. 18, lines 23-54 --especially lines 27-32).

**Reinberg** discloses that it is known to use plasma CVD to deposit high quality silicon-containing films using a mixture of a silicon-containing gas and at least a hydrogen (col. 1, lines 19-22).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use silicon and hydrogen as the raw material gases as taught by **Reinberg**, using the method of **Mizuno**, because **Mizuno** teaches that the method achieves the benefits for CVD film formation.

### *Conclusion*

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,100,466 (**Nishimoto**) teaches a PECVD device similar to that in the **Nishimoto** reference applied above.

US 5,476,798 (**Guha**) teaches a PECVD method wherein a voltage is applied to an auxiliary electrode **60** in a plasma generation region **54**. (See Fig. 1.)

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 703-306-5980. The examiner can normally be reached on 9:00 - 19:30 on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Erik Kielin  
December 18, 2002